Lucent Technologies
Bell Labs Innovations

WaveStar™ OLS 40G
Release 3.4

User/Service Manual

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The Lucent Technologies North American Regional Technical Assistance Center (NARTAC) provides a technical assistance telephone number that is monitored 24 hours a day. For technical assistance, call **1-800-225-RTAC** (**1-800-225-7822**). You can also call this telephone number to provide comments on the product or to suggest enhancements.

International customers, please either call +1-630-224-4672: Prompt 2 or contact your Account Executive for your local technical support number.

This document was developed by the Lucent Technologies Optical Networking Group, Lucent Learning Organization.

Addendum

Overview

Purpose This addendum provides the following:

- Information about the LEA107B circuit pack, which is compatible with Release 3.4.2.
- A new "Appendix D: Power Down/Power Up an Optical Network Element (NE)."
- An updated TAP-153, "Clear Combination ‘TLM Failure’ and ‘OA Failure."
- Updated "Optical Line Parameter" information in the "Performance Monitoring" section of Chapter 9.
- Updated Detailed Level Procedure 514 (DLP-514).

Instructions Please insert the parts of this addendum into the *WaveStar™ OLS 40G Release 3.4 User/Service Manual* according to the following table.

Addendum Section	Location in the User Service Manual
Addendum Overview (this page)	Front (just after title page)
Appendix D: Power Down/Power Up an Optical Network Element (NE)	Just before Glossary
TAP-153: Clear Combination ‘TLM Failure’ and ‘OA Failure’	In place of existing TAP-153

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Addendum Section	Location in the User Service Manual
Performance Monitoring (Pages 9-27 through 9-36)	In place of existing Pages 9-27 through 9-36
DLP-514: Install/Remove Circuit Pack	In place of existing DLP-514

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LEA107B The LEA107B can be used in place of the LEA104. The engineering rues and output specifications are the same. The difference between the LEA107B and the LEA104 are described in the following sections.

OMON Port The LEA107B includes an optical monitoring test port at the optical amplifier output. The port enables the customer to monitor data channels using an optical spectrum analysis instrument.

Supervisory Channel The LEA107B uses a dual filter to support either a 1510nm or 1532nm optical supervisory channel (OSC).

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Appendix D: Power Down/Power Up an Optical Network Element (NE)

Overview

Purpose

This procedure is designed to help Lucent customers prepare for a planned loss of power to all or part of a central office. The loss of power to any NE will cause a loss of traffic on that NE, so traffic must be rerouted around the NE. Because there are so many variations from product to product, this procedure is written at a high level. See the specific product documentation if you need more details for any step.

Personnel

The personnel performing this procedure should have knowledge of the specific product being powered down and/or powered up and should have access to specific product documentation so that they can determine whether the NE is functioning properly and address any problems that may occur.

Shelf power

Any shelf that receives electrical power has either two (A and B) circuit breakers or two (A and B) fuses. Most NE shelves do receive electrical power. The circuit breakers or fuses may be located on the shelf itself or at the top of the bay frame.

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Power Down an Optical Network Element (NE)

CAUTION

Electrostatic Discharge

Use a static ground wrist strap whenever handling circuit packs or working on a network element to prevent electrostatic discharge (ESD) damage to sensitive components.

1 Reroute traffic around the NE.

2 Power down each shelf in one of the following ways:

- Shut off both A and B circuit breakers by inserting an object such as a thin flathead screwdriver into the slot on the "off" side of each circuit breaker.
- Remove both A and B fuses by lifting the cover, then pressing in and down, then releasing to allow the fuse to spring outward.

3 Shut off power at the Battery Distribution Feeder Bay (BDFB)

END OF STEPS

Power Up an Optical Network Element (NE)

CAUTION

Electrostatic Discharge

Use a static ground wrist strap whenever handling circuit packs or working on a network element to prevent electrostatic discharge (ESD) damage to sensitive components.

1 Make sure that the circuit breakers are off or the fuses are removed from the network element.

Result: This eliminates any chance of one person powering up at the Battery Distribution Feeder Bay (BDFB) while someone else could be exposed to electrical power at the network element.

2 Turn on the power supply to this network element at the BDFB.

3 Continue with the next step for the shelf containing the system controller circuit pack.

4 Power up the shelf and verify that both A and B power supplies are good as follows:

1. Turn on circuit breaker A or insert fuse A and press inward and upward.

   If the green power on LED is not lit, check for a reversal on the power feeder and verify there is voltage at the connector.
2. Turn off circuit breaker A or remove fuse A.
3. Turn on circuit breaker B or insert fuse B and press inward and upward.

   If the green power on LED is not lit, check for a reversal on the power feeder and verify there is voltage at the connector.

4. Turn on circuit breaker A or insert fuse A and press inward and upward.

   Result: You have verified that both A and B power supplies are good and are now turned on.

5 Wait for all of the circuit packs on this shelf to finish booting, indicated by the following:

- all red LEDs are off
- for packs with green LEDs, they are on steadily.

6 Repeat Step 4 and Step 5 for all other shelves that contain controller circuit packs.

7 Repeat Step 4 and Step 5 for all shelves that do not contain any controller circuit packs.

8 Log into the network element with a craft interface terminal and check alarms.

9 If any alarms appear, use the product documentation to clear them. For most products, the appropriate document will be an *Alarm Message and Trouble Clearing Guide* or a *User/Service Manual*.

10 If this NE allows cross-connection, verify that the cross-connections are correct. Refer to the appropriate product documentation, usually a *User Operations Guide* or a *User/Service Manual*.

11 Reroute traffic back onto this NE.

END OF STEPS

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Clear Combination 'TLM Failure' and 'OA Failure'

Overview: This procedure is used to clear a trouble that is characterized by a series of circuit pack failures, first the TLM and OA circuit packs, then approximately 90 minutes later, the TOHCTL and SYSCTL circuit packs fail with the SYSCTL locking up.

1. **NOTE:**
   The CIT will disconnect from the network element when the `CONFIGURATION-Initialize-System` command is executed.

   At the CIT, select `CONFIGURATION-Initialize-System: TID(All):PH(3)` command and execute.

2. Did the Optical Line System (network element) respond to the CIT?

   If **NO**, then continue with Step 3.
   If **YES**, then continue with Step 4.

3. **NOTE:**
   This indicates the SYSCTL circuit pack is locked up.

   Go to Step 7 ONLY AFTER VERIFYING from an alternate maintenance history log (if available) that a combination TLM failure and OA failure occurred. If unable to verify, contact your next level of technical support.

4. Wait 15 minutes or until the **MJ** LED is off at the user panel, whichever comes first. Reset takes approximately 15 minutes but some user panel Led flash and relays click in about a minute indicating that reset has started. If the network element is equipped with OTPMs, wait an additional 5 minutes.

5. At the CIT, select `FAULT-Retrieve-Condition-All` command and execute to obtain a report.

6. Have BOTH failures cleared (combination `TLM failure` and `OA failure`)?

   If **NO**, then continue with Step 7.
   If **YES**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE**.

7. Unseat the SYSMEM circuit pack.

8. Reseat the SYSMEM circuit pack.

9. Wait for the SYSMEM circuit pack to reboot. (All of the LEDs light up and then shut off.)

10. Try to log into the network element.

11. Was your login successful?

    If **NO**, then continue with Step 14.
    If **YES,** then Step 12.

12. At the CIT, select `FAULT-Retrieve-Condition-All` command and execute to obtain a report.

13. Do any conditions appear?

    If **NO**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE**.
    If **YES**, then refer to the appropriate TAP or contact your next level of technical support.

14. Replace the SYSMEM pack with one of the same series or higher.

15. After the SYSMEM boots up, install the appropriate software.

    Reference: NTP-002, "Install Software (Initial Installation/Upgrade/Change) into CIT and Optical Line System Network Element"

16. Was your software installation successful?

    If **NO**, then contact your next level of technical support.
    If **YES**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE**.

17. **STOP! YOU HAVE COMPLETED THIS PROCEDURE**.

Provisioning Consistency Audits

The *WaveStar* OLS 40G audits (monitors) the following provisioning information:

- **Target Identifier (TID)**: Each *WaveStar* OLS 40G network element in a network must have a unique TID. The *WaveStar* OLS 40G automatically detects and reports any duplicated TIDs.
- **End Terminal Direction**: Each OLS end terminal must have the direction parameter provisioned as 1A-TX, 1A-TX-THRU, 1A-RCV, 1A-RCV-THRU, or DUAL. The direction parameter at one end terminal in a network must be provisioned as 1A-TX and the direction parameter at the other end terminal must be provisioned as 1A-RCV. The direction parameter at both end terminals must not be provisioned the same value. In Release 2.1 and later releases, an OLS end terminal may also be provisioned as a dual facing end terminal (DUAL). In Release 3 and later releases, one OLS End Terminal may be provisioned 1A-TX-THRU and another colocated back-to-back OLS End Terminal may be provisioned 1A-RCV-THRU in applications with telemetry pass through.The *WaveStar* OLS 40G automatically detects and reports any inconsistent values.

The *WaveStar* OLS 40G also makes provisioning consistency information available in reports. For more information, refer to the **`SECURITY-Retrieve-System`** command in Section 11, "Craft Interface Terminal Usage."

Performance Monitoring

Performance Parameters

The *WaveStar* OLS 40G provides performance monitoring to support proactive maintenance of a network. Proactive maintenance refers to the process of detecting degrading conditions not severe enough to initiate protection switching or alarming, but indicative of an impending hard or soft failure.

Proactive maintenance consists of monitoring performance parameters associated with the optical lines, optical channels, supervisory channels, and customer maintenance signals. Table 9-5 lists the performance parameters monitored.

Performance parameter thresholds are set to show degraded performance. When a performance-monitoring threshold is crossed, it is reported to the operations system where all threshold crossings associated with a particular path can be correlated, and the likely source of the degradation can be identified.

In Release 3.3 and higher, the only derived performance parameter is the severely errored seconds (SES) which is based on lost of signal.

For more information about provisioning thresholds and enabling/disabling the reporting of threshold crossing alerts (TCAs) to an operations system, refer to Section 8, "Administration and Provisioning."

Table 9-5. Performance-Monitoring Parameters

Facility	Measured Parameter	Maximum Counts	
		Current 15 Minute	Current 1 Day
Optical Line	Total Optical Power Received (TOPR-OL)	—	—
	Laser Bias Current for Pump 1 (LBC-P1)	—	—
	Laser Bias Current for Pump 2 (LBC-P2)	—	—
	Laser Backface Current for Pump 1 (LBFC-P1)	—	—
	Laser Backface Current for Pump 2 (LBFC-P2)	—	—
OC-48/STM-16 Line*	Laser Bias Current (LBC)	—	—
	Optical Power Transmit (OPT)	—	—
	Optical Power Received (OPR)	—	—
Optical Channel	Signal Power Received (SPR-C)	—	—
Supervisory Channel	Signal Power Received (SPR-SU)	—	—
	Laser Bias Current (LBC-SU)	—	—
	Line (B2) Coding Violations (CV-L)	14000	1343750
	Line (B2) Errored Seconds (ES-L)	900	65535
	Line (B2) Severely Errored Seconds (SES-L)	900	65535
	Line (B2) Unavailable Seconds (UAS-L)	900	65535

See footnotes at end of table.

Table 9-5. Performance-Monitoring Parameters (Contd)

Facility	Measured Parameter	Maximum Counts	
		Current 15 Minute	Current 1 Day
Optical Translator Port Signals*	OC-3/STM-1Section (B1) Coding Violations (CV-S)	64000	1343750
	OC-12/STM-4Section (B1) Coding Violations (CV-S)	56000	5375000
	OC-48/STM-16 Section (B1) Coding Violations (CV-S)	224000	21500000
	Section (B1) Errored Seconds (ES-S)	900	65535
	Section (B1) Severely Errored Seconds (SES-S)	900	65535
	Section (B1) Severely Errored Frame Seconds (SEFS-S)	900	65535

* Release 3 and later releases.

Optical Line Parameters

The following optical line parameters are monitored continuously to detect degraded performance of the laser:

- **Total Optical Power Received (TOPR-OL)**: This parameter is the total power for all the optical channels. The total optical power received is reported using a scale from 0 to 100. The total optical power received parameter can be used with other proactive performance-monitoring parameters to isolate the source of an impending optical line failure.
- **Laser Bias Current for Pump 1 and Pump 2 (LBC-P1 and LBC-P2)**: Laser bias current is the actual measured bias current divided by a factory-measured beginning-of-life value for the given condition. This value tends to increase over the life of the pump. A greater value than 1.5 may indicate that the pump is approaching its end of life. If you detect a value greater than 1.5, the LBC should be monitored at least once per month. If the LBC continues to increase and reaches a value of 1.75, the unit should be replaced. Contact your next level of support to implement the change.
- **Laser Backface Current for Pump 1 and Pump 2 (LBFC-P1 and LBFC-P2)**: Laser backface current is the actual measured backface current divided by a factory-measured target backface current. This value tends to decrease over the life of the pump. A value less than 0.875 may indicate that the pump is approaching its end of life. If you detect a value less than 0.875, the LBFC should be monitored at least once per month. If the LBFC continues to decrease and reaches a value of 0.75, the unit should be replaced. Contact your next level of support to implement the change.

The current values for these parameters can be retrieved using the **`PERFORMANCE-Retrieve-Performance_Monitoring-Optical_Line`** command from CenterLink or the **`RTRV-PM-OLINE`** TL-1 command from the element management system.

Threshold crossing alerts (TCAs) are generated if the TOPR-OL parameter exceeds the set thresholds. (Threshold crossing alerts are not supported for the

LBC-P1, LBC-P2, LBFC-P1, and LBFC-P2 parameters.) The generation of TCAs for the TOPR-OL parameter can be enabled or disabled using the **`PERFORMANCE-Set-Threshold-Optical Line`** command. In Release 2 and later releases, TCAs can be enabled or disabled for a single parameter.

OC-48/STM-16 Line Parameters

In Release 3 and later releases, the following OC-48/STM-16 optical parameters are monitored continuously to detect degraded performance of the laser:

- **Laser Bias Current (LBC)**: This parameter indicates whether the system optics are working within normal margins (in range or out of range). The upper limit is 1.5 times the initial factory (nominal) value. There is no lower limit.
- **Optical Power Transmit (OPT)**: This parameter indicates whether the signal power (facet power) generated by the laser is within normal margins (in range and out of range). The upper limit is 0.8 dBm above the initial factory (nominal) value, and the lower limit is 1.0 dBm below the initial factory (nominal) value.
- **Optical Power Receive (OPR)**: This parameter is not an absolute measure of the received optical power and, therefore, should not be used as a proactive performance-monitoring parameter. The optical power receive parameter indicates whether the received optical power is currently within the nominal sensitivity limits of the receiver (in range or out of range). The optical power receive parameter can be used with other proactive performance-monitoring parameters to isolate the source of an impending high speed failure.

Threshold crossing alerts are not supported for the OC-48/STM-16 line parameters.

Optical Channel Parameters

The following optical channel parameters are monitored continuously to detect degraded performance of the laser:

- **Signal Power Received (SPR-C)**: This parameter is the measurement of the signal power per channel. The signal power is determined by monitoring the power of the tone on the supervisory signal. The signal power received is reported using a scale from 0 to 100. The signal power received parameter can be used with other proactive performance-monitoring parameters to isolate the source of an impending optical channel failure.

Threshold crossing alerts (TCAs) are generated if the SPR-C parameter exceeds the set thresholds. The generation of TCAs can be enabled or disabled using the **`PERFORMANCE-Set-Threshold-Optical Channel`** command. In Release 2 and later releases, TCAs can be enabled or disabled for a single parameter.

Supervisory Channel Parameters

The following supervisory channel parameters are monitored continuously to detect degraded performance of the laser:

- **Signal Power Received (SPR-SU)**: This parameter is the measurement of the supervisory channel signal power. The signal power is determined by monitoring the power of the tone on the supervisory signal. The signal power received is reported using a scale from 0 to 100. The signal power received parameter can be used with other proactive performance-monitoring parameters to isolate the source of an impending supervisory channel failure.
- **Laser Bias Current (LBC-SU)**: This parameter indicates whether the system optics are working within normal margins (in range or out of range). The upper limit is 1.5 times the initial factory (nominal) value. There is no lower limit.
- **Line (B2) Coding Violations (CV-L)**: To monitor the performance of the supervisory channel, the line B2 parity is calculated, written, and checked for errors. The line B2 parity violation counter is incremented for each line bit interleaved parity (BIP) error detected. Each line BIP-8 can detect up to eight errors per STS-1 frame.
- **Line (B2) Errored Seconds (ES-L)**: An errored second (ES) is a second in which there are one or more B2 parity violations or a supervisory channel defect detected.
- **Line (B2) Severely Errored Seconds (SES-L)**: A severely errored second (SES) is a second in which there are 9 or more B2 parity violations or a supervisory channel AIS defect detected.
- **Line (B2) Unavailable Seconds (UAS-L)**: An unavailable second (UAS) is a second during which the supervisory channel is "unavailable." Unavailable seconds are counted after 10 consecutive line (B2) severely errored seconds (SES). These 10 severely errored seconds are counted, and each subsequent second is counted until there are 10 consecutive seconds without a severely errored second. The 10 consecutive seconds without a severely errored second are not counted as unavailable seconds.

  A threshold crossing alert (TCA) is generated if a CV-L, ES-L, SES-L, or UAS-L parameter exceeds the provisionable threshold. The generation of TCAs can be enabled or disabled using the **`PERFORMANCE-Set-Threshold-Supervisory`** command. In Release 2 and later releases, TCAs can be enabled or disabled for a single parameter.

Optical Translator Port Signal Parameters

In Release 3 and later releases, the following OC-48/STM-16, OC-12/STM-4, and OC-3/STM-1 section parameters are monitored:

- **Section (B1) Coding Violations (CV-S)**: To monitor the performance of an OC-48/STM-16, OC-12/STM-4, or OC-3/STM-1 section, the section B1 parity is calculated, written, and checked for errors. The section B1 parity violation counter is incremented for each section error detected.
- **Section (B1) Errored Seconds (ES-S)**: An errored second (ES) is a second in which there are one or more B1 parity violations detected, one or more LOS defects, or one or more LOF defects.
- **Section (B1) Severely Errored Seconds (SES-S)**: A severely errored second (SES) is a second in which there are 16 or more B1 parity violations detected on an OC-3/STM-1 section, 63 or more B1 parity violations detected on an OC-12/STM-4 section, 249 or more B1 parity violations detected on an OC-48/STM-16 section, one or more LOS defects, or one or more LOF defects.
- **Section (B1) Severely Errored Frame Seconds (SEFS-S)**: A section severely errored frame second (SEFS) is the number of seconds during which an out-of-frame event occurred.

A threshold crossing alert (TCA) is generated if a section parameter exceeds the provisionable threshold. The generation of TCAs can be enabled or disabled using the **`PERFORMANCE-Set-Threshold-OT Port Signal`** command.

Performance-Monitoring Data Storage and Reports

The *WaveStar* OLS 40G provides current 15-minute and current 1-day registers for all accumulated performance parameters. There is also 5 previous 1-day registers and 31 previous 15-minute registers (8 hours).

NOTE:
The 15-minute and 1-day intervals are accurate to within ±10 seconds. For example, a 15-minute interval (900 seconds) varies from 890 to 910 seconds.

The *WaveStar* OLS 40G can initialize the current 15-minute and/or current 1-day registers through the CIT at any time, as well as retrieve and report the contents of any parameter storage register at any time. When performance-monitoring data is retrieved, any previous 1-day or 15-minute register with all zero data is not reported. The current 1-day and 15-minute registers are always reported, even when they contain all zero data.

For examples of the **PERFROMANCE-Initialize-Register-All, PERFORMANCE-Retrieve-Performance Monitoring-All, PERFORMANCE-Retrieve-Performance Monitoring-Optical Channel, PERFORMANCE-Retrieve-Performance Monitoring-Optical Line, PERFORMANCE-Retrieve-Performance Monitoring-Supervisory,** and **PERFORMANCE-Retrieve-Performance Monitoring-OT Port Signal** (Release 3 and later) reports, refer to Section 11, “Craft Interface Terminal Usage.” For detailed information, refer to the on-line help available with the CenterLink Management Console or 365-575-540, *WaveStar OLS 40G, Operations Systems Engineering Guide*.

The *WaveStar* OLS 40G can also initialize (baseline) certain optical parameters of an optical line through the CIT at any time. The initialized (baseline) value of the affected optical parameters is measured and used as the normal operating reference. The affected optical parameters include the total optical power received for an optical line (TOPR-OL) and the optical channel signal power (SPR-C) of the addressed optical line. The optical parameters should be initialized when an Optical Amplifier circuit pack is replaced, the outside plant loss changes or an optical channel is deleted. When these optical parameters are initialized, the current 1-day and/or current 15-minute registers for the TOPR-OL and SPR-C parameters will be corrupted.

For detailed information about the **PERFORMANCE-Initialize-Register-Optical Line** command, refer to the on-line help available with the CenterLink Management Console or 365-575-540, *WaveStar OLS 40G, Operations Systems Engineering Guide*.

A single start time can be provisioned for measuring all the current 1-day performance-monitoring parameters. The start time can be provisioned to start at any hour. The performance-monitoring parameters will reset and begin daily at the provisioned start time. For more information about provisioning the performance-monitoring start time, refer to Section 8, "Administration and Provisioning."

Performance Monitoring During Failed Conditions

When a trouble condition is detected, the *WaveStar* OLS 40G stops accumulating affected performance parameters per Bellcore requirements. All unaffected performance parameters continue to be accumulated during the trouble condition. The coding violations (CV) and errored seconds (ES) counts are accumulated until a severely errored second (SES) is counted. When a severely errored second (SES) is counted, the coding violations (CV) count is inhibited. The errored seconds (ES) and severely errored seconds (SES) counts continue to be accumulated until an unavailable second (UAS) is counted. When an unavailable second (UAS) is counted, the coding violations (CV), errored seconds (ES), and severely errored seconds (SES) counts are inhibited.

The unavailable seconds (UAS) parameter counts are not inhibited.

Table 9-6 shows the parameters that are monitored during failed conditions and the parameters that are inhibited. Y shows the parameters that are monitored during the failed condition. N shows the parameter that are inhibited during the failed condition.

Table 9-6. Parameters Accumulated During Failed Conditions

	Failed Conditions									
	Optical Line		Optical Channel		Supervisory Channel				OT Port Signal	
Parameters	LOS	AIM	LOS	AIM	LOS	LOF	SF	SD	LOS	LOF
Optical Channel Optics										
Laser Bias Current (LBC-P)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Laser Backface Current (LBFC-P)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total Optical Power Received (TOPR-OL)	Y*	Y*	Y	Y	Y	Y	Y	Y	Y	Y
OC-48/STM-16 Line										
Laser Bias Current (LBC)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Optical Power Transmit (OPT)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Optical Power Received (OPR)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Optical Channel Optics										
Signal Power Received (SPR-C)	Y*	Y*	Y*	Y*	Y	Y	Y	Y	—	—

See footnotes at end of table.

Table 9-6. Parameters Accumulated During Failed Conditions (Contd)

	Failed Conditions									
	Optical Line		Optical Channel		Supervisory Channel				OT Port Signal	
Parameters	**LOS**	**AIM**	**LOS**	**AIM**	**LOS**	**LOF**	**SF**	**SD**	**LOS**	**LOF**
Supervisory Channel Optics										
Laser Bias Current (LBC-SU)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Signal Power Received (SPR-SU)	Y*	Y	Y	Y	Y*	Y*	Y*	Y*	Y	Y
Supervisory Channel Line										
Coding Violations (CV-L)	N	Y	Y	Y	N	N	N	N	Y	Y
Errored Seconds (ES-L)	N†	Y	Y	Y	N†	N†	N†	N†	Y	Y
Severely Errored Seconds (SES-L)	N†	Y	Y	Y	N†	N†	N†	N†	Y	Y
Unavailable Seconds (UAS-L)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
OT Port Signal										
Coding Violations (CV-S)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Errored Seconds (ES-S)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Severely Errored Seconds (SES-S)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Severely Errored Frame Seconds (SEFS-S)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

* Autonomous TCA reporting for this parameter is inhibited during failed conditions.

† This parameter is inhibited during periods of unavailability only.

Performance-Monitoring Parameter Thresholds

The current 15-minute and current 1-day thresholds for each performance-monitoring parameter are provisionable using the CIT. Whenever the current 15-minute or the current 1-day threshold for a given performance-monitoring parameter is reached or exceeded, the *WaveStar* OLS 40G generates a threshold crossing alert (TCA). The TCA is then entered into the appropriate performance-monitoring report.

For information about provisioning thresholds using the **PERFORMANCE-Set-Threshold-All, PERFORMANCE-Set-Threshold-Optical Channel, PERFORMANCE-Set-Threshold-Optical Line, PERFORMANCE-Set-Threshold-Supervisory** and **PERFORMANCE-Set-Threshold-OT Port Signal** (Release 3 and later) commands, refer to the on-line help available with the CenterLink Management Console or 365-575-540, *WaveStar OLS 40G, Operations Systems Engineering Guide*.

Also refer to examples of the **PERFORMANCE-Retrieve-Threshold-Optical Line, PERFORMANCE-Retrieve-Threshold-Optical Channel, PERFORMANCE-Retrieve-Threshold-Supervisory** and **PERFORMANCE-Retrieve-Threshold-OT Port Signal** (Release 3 and later) reports in Section 11, “Craft Interface Terminal Usage.” For detailed information, refer to the on-line help available with the CenterLink Management Console or 365-575-540, *WaveStar OLS 40G, Operations Systems Engineering Guide*.

Threshold Crossing Alert Transmission to an Operations System

To trigger proactive maintenance activity within an operations system, the *WaveStar* OLS 40G supports autonomous messages reporting threshold cross alerts. These autonomous messages show the crossing of a performance-monitoring threshold for the current 15-minute and 1-day registers.

Install/Remove Circuit Pack

CAUTION:
Use a static ground wrist strap whenever handling circuit packs or working on an OLS network element to prevent electrostatic discharge damage to sensitive components.

CAUTION:
Do not remove the SYSCTL circuit pack unless instructed to by the procedure that sent you here. If the SYSCTL circuit pack is removed, provisioning data could be lost.

NOTE:
Verify that all fibers are labeled to prevent possible service interruption.

1. Are you to remove or install a circuit pack?

   If to **remove**, then continue with Step 2.
   If to **install**, then continue with Step 21.

2. What type of circuit pack is being removed?

   If **OA circuit pack**, then continue with Step 3.
   If **TLM circuit pack**, then continue with Step 13.
   If **TOHCTL circuit pack**, then continue with Step 18.
   If **SYSMEM circuit pack**, then continue with Step 18.
   If **SYSCTL circuit pack**, then continue with Step 18.
   If **OTU circuit pack**, then continue with Step 46
   If **OTPM circuit pack**, then continue with Step 52.
   If **QOTU circuit pack**, then continue with Step 57.

Remove OA

3. **WARNING:**
   Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with improper optical instruments. Avoid direct exposure to the beam.

   Remove any optical fibers from the guide below the shelf for the circuit pack being removed.

4. **CAUTION:**
   The OA circuit pack must be unseated from the backplane before removing the output optical connector.

   Disengage the OA circuit pack from the shelf.

5. Remove the incoming fiber from the **IN** optical connectors of the OA circuit pack and install a protector cap on the fiber.

6. Remove the outgoing fiber from the **OUT** optical connectors of the OA circuit pack and install a protector cap on the fiber.

7. Remove the optical fibers from the **TLM IN** and/or **TLM OUT** connectors of the OA circuit pack and install protector caps on the fibers.

8. Remove any buildouts from the OA circuit pack and store for future use.

   Reference: **DLP-512**

9. Remove the circuit pack from the shelf by carefully sliding the circuit pack out of the slot guides to remove it from the shelf. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.

10. Connect to the Network Element using the CIT.

    Reference: DLP-501

11. At the CIT, select `CONFIGURATION-Update-System` command and execute.

12. Are you to install another circuit pack in this slot?

    If **YES**, then continue with Step 21.
    If **NO**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Remove TLM

13. Remove the optical fibers from the slot guide on the shelf. This is to prevent damage to the fiber when the circuit pack is removed.

14. Remove the outgoing fiber from the **OUT** optical connectors of the TLM circuit pack and install a protector cap on the fiber.

15. Remove the incoming fiber from the **IN** optical connectors of the TLM circuit pack and install a protector cap on the fiber.

16. Remove the optical fibers from the **CM IN** and **CM OUT** connectors of the TLM circuit pack and install protector caps on the fibers.

17. Remove any LBOs from the TLM circuit pack and store for future use.

    Reference: **DLP-512**

Remove TOHCTL, SYSMEM, or SYSCTL

18. Remove the circuit pack from the shelf as follows:

    a. Push up on the locking clip to unlock the circuit pack latch.

    b. Unseat the circuit pack by carefully and continuously pulling out on the circuit pack latch.

    c. Carefully slide the circuit pack out of the slot guides to remove it from the shelf. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.

19. Are you to install another circuit pack in this slot?

    If **YES**, then continue with Step 21.
    If **NO**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

20. If applicable, remove the apparatus (circuit pack) blank from the slot.

    Reference: **DLP-525**

21. What type of circuit pack is being installed?

    If **OA circuit pack**, then continue with Step 24.
    If **TLM circuit pack**, then continue with Step 40.
    If **TOHCTL circuit pack**, then continue with Step 22.
    If **SYSMEM circuit pack**, then continue with Step 22.
    If **SYSCTL circuit pack**, then continue with Step 22.
    If **OTU circuit pack**, then continue with Step 62.
    If **OTPM circuit pack**, then continue with Step 68.
    If **QOTU circuit pack**, then continue with Step 74.

Install TOHCTL, SYSMEM, or SYSCTL

22. Install the circuit pack into the slot as follows:

    a. If necessary, close both latches on the circuit pack.

    b. Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. DO NOT ROCK THE CIRCUIT PACK OR UNIT BACK AND FORTH.

    c. Open the latches and push the circuit pack until it engages the connector pins.

    d. With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged (the clips are in the locked position).

23. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Install OA

24. Is the circuit pack being installed either an end terminal receive OA or a single OA configuration transmit OA circuit pack?

    If **NO**, then continue with Step 33.
    If **YES**, then continue with Step 25.

25. Install the circuit pack into the slot as follows:

    a. If necessary, close both latches on the circuit pack.

    b. Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. DO NOT ROCK THE CIRCUIT PACK OR UNIT BACK AND FORTH.

26. Clean and connect the outgoing optical fiber to the **OUT** connector of the OA circuit pack.

27. Clean and connect the TLM IN and OUT optical fibers to their proper locations.

28. Seat the OA circuit pack into the shelf as follows:

    a. Open the latches and push the circuit pack until it engages the connector pins.

    b. With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged (the clips are in the locked position).

29. Wait until the `ODU warmup in progress` condition clears or wait 15 minutes for the ODU temperature to stabilize in Releases 2.0 and earlier.

30. If required, clean and install the lightguide buildout to the **IN** connector of the receive OA circuit pack.

    Reference: **DLP-512**

31. Clean the incoming optical line fiber and connector and make the connection to the **IN** connector.

    Reference: **DLP-510**

32. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

33. Install the circuit pack into the slot as follows:

    a. If necessary, close both latches on the circuit pack.

    b. Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. DO NOT ROCK THE CIRCUIT PACK OR UNIT BACK AND FORTH.

34. If required, install the LBO at the **IN** and **OUT** connectors of the OA circuit pack.

    Reference: **DLP-512**

35. Clean the optical fibers and connectors that will connect to the **IN** and **OUT** OA connectors.

    Reference: **DLP-510**

36. Connect the optical fibers to the LBOs and/or optical connectors at the OA circuit pack.

37. Connect the remaining optical fiber(s) to their proper location(s).

38. Seat the OA circuit pack into the shelf as follows:

    a. Open the latches and push the circuit pack until it engages the connector pins.

    b. With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged (the clips are in the locked position).

39. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Install TLM

40. Install the circuit pack as follows:

    a. Open the latch on the circuit pack.

    b. Place the circuit pack into the slot guides and slowly slide it into the shelf until latch engages the shelf.

    c. With a thumb on the latch, continue sliding the circuit pack with one firm, continuous motion until latch is fully engaged (locking clip is in locked position.)

41. If required, install LBOs at the **CM IN** and **CM OUT** connectors of the TLM circuit pack.

    Reference: **DLP-512**

42. Clean the optical fibers and connectors.

    Reference: **DLP-510**

43. Connect the optical fibers to the LBOs and/or optical connectors at the TLM circuit pack.

44. Connect the remaining optical fibers to their proper locations.

45. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Remove OTU

46. Remove the optical fibers from the slot guide on the shelf.

47. Remove the optical fiber from the **OUT** connector of the OTU circuit pack and install a protector cap on the fiber.

48. Remove the optical fiber from the **IN** connector of the OTU circuit pack and install a protector cap on the fiber.

49. If required, remove any LBOs from the OTU circuit pack and store for future use.

50. NOTE:
    If the OTU circuit pack being removed is in the left-most or right-most slot of the self, the gasket material around the shelf may interfere. Remove the pack carefully, and if the gasket material is dislodged, then replace the gasket material after the replacement pack has been inserted.

    Remove the OTU circuit pack from the shelf as follows:

    a. Push up on the bottom and down on the top metal locking clips to unlock the circuit pack latches.

    b. Unseat the circuit pack by carefully and continuously pulling out equally on the top and bottom latches.

    c. Carefully slide the circuit pack out of the slot guides to remove it from the shelf. DO NOT ROCK THE UNIT OR CIRCUIT PACK BACK AND FORTH.

51. Are you to install another OTU circuit pack in this slot?

    If **YES**, continue with Step 21.
    If **NO**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Remove OTPM

52. Remove the optical fiber from the **OUT** connector of the OTPM circuit pack and install a protector cap on the fiber.

53. Remove the optical fiber from the **IN** connector of the OTPM circuit pack and install a protector cap on the fiber.

54. If required, remove any LBOs from the OTPM circuit pack and store for future use.

55. Remove the OTPM circuit pack from the QOTU as follows:

a. Unscrew both thumb screws on the OTPM to be removed.

b. Unseat the OTPM by carefully and continuously pulling out equally on the top and bottom thumb screws.

c. Carefully slide the OTPM out of the slot guides to remove it from the QOTU. DO NOT ROCK THE UNIT OR CIRCUIT PACK BACK AND FORTH.

56. Are you to install another OTPM circuit pack in this slot?

If **YES**, continue with Step 21.
If **NO**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Remove QOTU

57. Remove the optical fibers from the slot guide on the shelf.

58. Remove the optical fiber from the **OUT** connectors of each OTPM circuit pack and install a protector cap on the fiber.

59. Remove the optical fiber from the **IN** connectors of each OTPM circuit pack and install a protector cap on the fiber.

60. Remove the QOTU circuit pack from the shelf as follows:

a. Push up on the bottom and down on the top metal locking clips to unlock the circuit pack latches.

b. Unseat the circuit pack by carefully and continuously pulling out equally on the top and bottom latches.

c. Carefully slide the circuit pack out of the slot guides to remove it from the shelf. DO NOT ROCK THE UNIT OR CIRCUIT PACK BACK AND FORTH.

61. Are you to install another QOTU circuit pack in this slot?

If **YES** continue with Step 21.
If **NO**, then **STOP! YOU HAVE COMPLETED THIS PROCEDURE**.

Install OTU

62. **CAUTION:**
The replacement OTU must have the same circuit pack code or traffic could be interrupted.

NOTE:
If the OTU circuit pack being installed is in the left-most or right-most slot of the shelf, the gasket material around the shelf may interfere. Install the pack carefully, and if the gasket material is dislodged, then replace the gasket material after the circuit pack has been inserted.

Install the circuit pack as follows:

a. If necessary, close both latches on the circuit pack.

b. Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. DO NOT ROCK THE UNIT OR CIRCUIT PACK BACK AND FORTH.

c. Open the latches and push the circuit pack until it engages the connector pins.

d. With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged (the metal clips are in the locked position).

63. If required, determine value of LBO required for the **IN** connector.

Reference: **DLP-524**

64. Clean optical fibers and connectors.

Reference: **DLP-510**

65. If required, install LBO at the **IN** and **OUT** connectors of the OTU circuit pack.

Reference: **DLP-512**

66. Connect the optical fiber to the **IN** and **OUT** connectors for the OTU circuit pack.

67. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Install OTPM

68. **CAUTION:**
The replacement OTU must have the same circuit pack code or traffic could be interrupted.

Install OTPM as follows:

a. Place the OTPM into the slot guides and slowly slide it into the QOTU until the screws touch the frame. DO NOT ROCK THE UNIT OR CIRCUIT PACK BACK AND FORTH.

b. Tighten the screws until they are snug. DO NOT over tighten with a screwdriver.

69. If required determine value of LBO required for the **IN** connector.

Reference: **DLP-524**

70. Clean optical fibers and connectors.

Reference: **DLP-510**

71. If required, install LBO at the **IN** and **OUT** connectors of the OTPM circuit pack.

Reference: **DLP-512**

72. Connect the optical fiber to the **IN** and **OUT** connectors of the OTPM circuit pack.

Reference: **DLP-525**

73. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

Install QOTU

74. Install the QOTU as follows:

a. If necessary, close both latches on the circuit pack.

b. Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. DO NOT ROCK THE UNIT OR CIRCUIT PACK BACK AND FORTH.

c. Open the latches and push the circuit pack until it engages the connector pins.

d. With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged (the metal clips are in the locked position).

75. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**